Title: "Exploring organizational factors for the implementation of strategies to reduce door to balloon time"

Authors: Sajid Haider, Carmen De Pablos Heredero and Antonio Fernandez-Ortiz

How to reference: Exploring organizational factors for the implementation of strategies to reduce door to balloon time /Sajid Haider, Carmen De Pablos Heredero and Antonio Fernandez-Ortiz/Exp Clin Cardiol Vol 20 Issue 10 pages 6258-6270 / 2014
Exploring organizational factors for the implementation of strategies to reduce door to balloon time

Original article

Sajid Haider, PhD\textsuperscript{1} Carmen de Pablos Heredero, PhD\textsuperscript{2}, Antonio Fernandez-Ortiz, MD, PhD\textsuperscript{3}

\textsuperscript{1}COMSATS Institute of Information Technology, Vehari, Pakistan
\textsuperscript{2}Universidad Rey Juan Carlos, Madrid, Spain
\textsuperscript{3}Hospital Clinico San Carlos, Madrid, Spain

Corresponding author: Dr. Sajid Haider, Email: sajidhaider@ciitvehari.edu.pk
Abstract

Background: Although the effectiveness of strategies to reduce door to balloon time has been well recognized, unfortunately they remain underused. No systematic study exists to address the routine use of these strategies.

Objective: To identify organizational factors that may facilitate the implementation of strategies to reduce door to balloon time, as measured by STEMI care professionals’ opinion.

Method: Both qualitative and quantitative techniques were used. Qualitative study involved site visits, discussion sessions, and content analysis. Quantitative analysis used summed rank orders and non-parametric statistics.

Results: Qualitative analysis identified nine organizational factors. These factors were further refined in quantitative analysis. The highest rank was assigned to positive behaviors while the lowest rank was given to rewards. Five most important factors—positive behaviors, teamwork, committed clinical leadership, multidisciplinary liaison, and senior management’s support—were identified. The results indicate that the factors under analysis were ranked significantly different from each other. Kendall’s coefficient of concordance = 0.453, Chi-square = 221.277, and the test result is significant (p-value < 0.01).

Conclusion: Knowledge of strategies to reduce door to balloon time, although important, may not be sufficient unless they are used in routine. Some specific organizational factors can facilitate the routine use of these strategies.

Keywords
Percutaneous Coronary Intervention, strategies to reduce door to balloon time, organizational factors

1. Introduction

Cardiovascular diseases (CVDs) are the major cause of global deaths [1]. According to WHO statistics, CVDs were responsible for an estimated 17.3 million deaths in 2008. These deaths account for a 30% of the global deaths. CVDs are expected to remain the leading cause of deaths worldwide. Among the CVDs, coronary heart disease (CHD) is the leading cause of deaths worldwide [1]. In 2008, CHD was responsible for almost 42.2 % of global deaths caused by CVDs.

Coronary heart disease (CHD) or coronary artery disease (CAD) originates in atherosclerosis, a condition in which fatty deposits known as plaques build up along the inner wall of blood vessels. As the plaques grow thicker, the arteries narrow down and it is difficult for heart to pump blood throughout the human body. Acute Myocardial Infarction (AMI) or heart attack and Angina Pectoris (AP) are two leading manifestations of coronary artery disease. A more severe type of AMI is ST-segment elevation myocardial infarction (STEMI) which indicates a relatively large part of the heart muscle death due to complete occlusion of coronary artery.

There has been a long debate on the optimal therapeutic approach for STEMI [2]. Fibrinolysis and Percutaneous Coronary Intervention (PCI) are among the common and well established reperfusion therapies for STEMI. With respect to their impact on patient mortality and morbidity, the efficiency of these two reperfusion therapies has been well recognized in literature [3]. However, “Currently, primary...”
percutaneous coronary intervention (PPCI) is a preferred method of reperfusion, when it is performed in a [timely fashion] by an experienced team” [4].

PCI is called to be primary PCI when it is the first reperfusion therapy applied after acute coronary syndromes. In case PCI is performed after the application of other reperfusion therapy such as fibrinolysis, it is called rescue PCI. After STEMI is recognized, the preference is for PPCI if it can be performed within guideline recommended time. American College of Cardiology (ACC)/American Heart Association (AHA) and European Society of Cardiology (ESC) guidelines recommend PPCI as the preferred method of reperfusion over fibrinolysis, as long as it can be performed within recommended time [5].

Given the time as a major factor in determining the success of PPCI, timely delivery has been identified as the major barrier to the implementation of PPCI [5]. Delays are related to higher fatality rates in patients with STEMI treated by PPCI [6]. Due to the time sensitivity associated with PPCI, American College of Cardiology’s (ACC) guidelines have set a 90 minutes gold standard for primary PCI [7]. This 90 minutes threshold is commonly called as door to balloon time.

Door-to-balloon time is the interval from arrival of the patient at hospital to balloon angioplasty of occluded coronary artery in cardiac catheterization laboratory (CCL). Door to balloon time is an internationally recognized quality measure of STEMI care. Door to balloon time refers to a complex process of STEMI care in which many professional skills are involved.

Despite the clinical importance of prompt PCI, contemporary data suggest that most patients with STEMI exceed their door-to-balloon times [8]. In the real world phenomena treatment delays are considerably long to reduce the benefits of this preferred reperfusion strategy [9]. Delays in access to PCI result in greater infarct size; as the time passes the ejection fraction is reduced which increases the chances of lesser myocardial salvage [10]. Given the time restrictions associated with PPCI, reducing door to balloon time has become a challenge for clinicians and managers of coronary care [11].

In order to achieve the recommended door to balloon time, contemporary literature suggests some evidence based strategies to reduce door to balloon time [12]. These strategies include: 1) Cath Lab (Cardiac Catheterization Laboratory) activation by emergency medicine physician, 2) activating cath lab through a single call system, 3) activation of cath lab while the patient is en route, 4) staff arrival in cath lab is expected within 20 minutes of being paged, 4) an attending cardiologist always at hospital, 6) real time data feedback to ED (Emergency Department) and cath lab staff.

These evidence based strategies are well recognized hospital/system based best practices for reducing treatment delays in STEMI care process for the patients undergoing primary angioplasty. These strategies provide many useful ideas to healthcare organizations for improving the treatment process [11]. There exists lot evidence in literature about the effectiveness of these practices. The research evidence suggests that using a greater number of these strategies was correlated with a shorter door to balloon time [12].

Although the effectiveness of these strategies has been well recognized in literature, unfortunately they remain underused [13]. Bradley and colleagues also identified that the key strategies to reduce door to balloon time were significantly underused [12]. Their results indicate that only 82 out of 365 hospitals were using the strategy number one mentioned above. It accounts for 22.5% of the sample. Only 13.7% of the hospitals were using strategy 2, activating cath lab through a single call system. Activation of cath lab while the patient is en route was used by 9% hospitals only. In the same way, the use of strategy 4 to 6 was 11%, 3.8%, and 41.5%, respectively. Their results further indicate that only 2.2% of the sample hospitals were using four out of six strategies, and only 36% of the hospitals were using one of these strategies. These statistics indicate that these key strategies are significantly underused.
So, the dissemination of these “best practices in routine use” is a well recognized challenge [13]. But little attention has been given to understand how these strategies can be implemented, and the factors influencing effective implementation remain poorly understood [14,15]. So, in order to enhance our knowledge about the delivery of these best practices, a rigorous study of implementation is required [16]. We believe, an understanding of how these strategies can be successfully implemented, can provide useful insights to the hospitals towards a routine use of these strategies.

This research seeks is to explore those factors which can facilitate the implementation of these strategies. Since the last four decades, attitude toward the appropriate use of evidence into practice has evolved in many phases; from the era of optimism to the era of information technology and systems engineering [17,18]. The current era of evidence based practice (EBP) is mainly concerned with the redesigning of service delivery systems to address the facilitators and barriers for narrowing the gap between evidence and practice, and is mainly driven by the emphasis on describing the effective ways to change the behavior of healthcare organizations and service providers [17,18,19]. Given the importance of studying organizational and professional behavior for the implementation of evidence based practices, the emphasis on studying organizational contextual factors is emerging in healthcare literature [15].

Looking at this trend in literature, the specific objective of this research is to explore organizational factors that can influence the implementation of strategies for reducing door to balloon time. Existing literature on the implementation of evidence based practice explains dozens of organizational factors which explain the implementation of different EBPs in different contexts. But, unfortunately there exists no research on the identification of organizational factors for the implementation of strategies to reduce door to balloon time. So, in order to specify organizational factors that can influence the implementation of these strategies, we used both qualitative and quantitative techniques. Accordingly, we selected STEMI professionals from five PCI capable hospitals in Madrid Community of Spain.

2. Methodology

In order to explore organizational factors for the implementation of strategies to reduce door to balloon time we used both qualitative and quantitative techniques.

2.1. Participants

The participants of the study were sixty one STEMI care professionals from five PCI capable hospitals. The sample includes heads of interventional cardiology (5), interventional cardiologists (7), senior CCL nurses (6), CCL supervisors (5), heads of coronary unit (5), clinical cardiologists (6), senior CU nurses (5), CU supervisors (5), heads of emergency departments (5), emergency physicians (5), and senior emergency nurses (7). The sample represents experienced healthcare professionals involved in STEMI care.

2.2. Qualitative Analysis

Initially the idea was to invite all participants in a one-day session so that the initial qualitative data on organizational factors could be collected. However, due to some administrative and time constraints, it was not possible to call people from all organizations on the same day. Looking at this difficulty, the participants were approached at their work place. Before visiting a specific healthcare organization, it was assured that all the participants should be present on that specific day. Average time for each discussion was about 60 minutes, and there was one discussion session on each site. A brief introduction of the strategies to reduce door to balloon time was given to the participants. The focus question in all discussions was ‘what kind of organizational factors can facilitate a routine use of the strategies to reduce door to balloon time?’ The original version of this question was in Spanish language. The discussion was also conducted in Spanish language. All the necessary translations from Spanish to English were performed by two experts in both languages.
In case of all visits, two researchers were participating for collecting data. Both the researchers were well trained in all steps involved in AMI care process. One of these researchers played the role of facilitator. The facilitator’s task was to generate and facilitate group discussion on the identification of organizational factors to reduce door to balloon time. The other researcher took important notes and added the discussion where necessary. All the discussions were summarized on flip chart by highlighting the most prominent/key factors. As a feedback, the key points of each discussion were shared verbally with the participants. Any final thoughts from the participants were also included in the flip chart notes.

It took about three months to collect initial data from all selected healthcare professionals. On the completion of this process, a content analysis was performed. For the purpose of content analysis flip chart notes were transcribed by an independent transcriptionist. In order to assure accuracy, we compared the transcribed notes against flip chart notes.

2.2.1. Content analysis

After their accuracy and consistency was checked, the transcribed notes were entered into Atlas.ti for examining the emerging themes in data. Taking insight from existing research we fulfilled the requirement of the objectivity of analysis for developing precise categories [20,21]. In this regard we followed a three step process by using insights from literature [22]. First, we identified some general themes applicable to the implementation of strategies to reduce door to balloon time. In order to define categories we used single word descriptors from the data. Each category was determined after capturing all possible but idiosyncratic interpretations. This step helped to confirm that the discussion question was appropriate for deriving themes. Second, we tested the consistency and objectivity of categories through sample judgment process. In this process, we used a random number generator to obtain three samples of responses generated in the discussion. Based on the general themes derived by the authors, two independent researchers (judges) categorized these sample responses. In other words, the judges were asked to define a number of words which could explain a category. The final categories and their corresponding definitions have been shown in table 1.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring and evaluation</td>
<td>Evaluation</td>
</tr>
<tr>
<td>Rewards</td>
<td>Rewards</td>
</tr>
<tr>
<td>Multidisciplinary liaison</td>
<td>Liaison</td>
</tr>
<tr>
<td>Teamwork</td>
<td>Teamwork</td>
</tr>
<tr>
<td>Positive behaviors</td>
<td>Positive behavior</td>
</tr>
<tr>
<td>Committed clinical leadership</td>
<td>Committed clinical leaders</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Flexible protocols</td>
</tr>
<tr>
<td>Resources</td>
<td>Financial resources</td>
</tr>
<tr>
<td>Senior management’s support</td>
<td>Administrative support</td>
</tr>
</tbody>
</table>

Table 1. Categories of organizational factors for the implementation of strategies to reduce door to balloon time

Third, we entered each final category into Atlas.ti, and used Wildcards for category search. We used wildcards by using the definition list compiled by judges. In category search through wildcards a search expression such as “teamwork* | joint effort | collaboration*” finds all passages with these words. The outcomes of this search are the quotations which are also called as category hits [23]. These hits constitute passages related to a specific category. So, we used paragraphs for examining category hits.
Once the search results were gathered we reviewed them to avoid any misplacement of quotations in a category. We found only four quotations which were not properly placed. These misplaced category hits were removed from the corresponding category, and were placed in a suitable category.

2.2.2. Results of content analysis

In content analysis nine final categories were used (see table 2). The central question of discussion was: What kind of organizational factors can facilitate a routine use of the strategies to reduce door to balloon time? A total of 167 hits were identified for this question. Table 2 shows that teamwork was discussed the most (15\% while rewards were mentioned the least (7\%). The hit closer to teamwork was positive behaviors (14\%). The next closest hits are clinical leadership (13\%), multidisciplinary liaison (12\%), and senior management’s support (12\%). The content analysis helped identify some initial organizational factors for the implementation of strategies to reduce door to balloon time.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Total hits</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>What kind of organizational factors can facilitate a routine use of the strategies to reduce door to balloon time?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring and evaluation</td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td>Rewards</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Multidisciplinary liaison</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Teamwork</td>
<td>25</td>
<td>15</td>
</tr>
<tr>
<td>Positive behaviors</td>
<td>23</td>
<td>14</td>
</tr>
<tr>
<td>Committed clinical leadership</td>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td>Flexibility</td>
<td>15</td>
<td>9</td>
</tr>
<tr>
<td>Resources</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Senior management’s support</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>167</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2. Frequencies of codes (in number and percentage)

2.3. Quantitative analysis

Taking insights from existing research [22], we administered quantitative analysis by using summed rank order and a non parametric test. The respondents evaluated nine organizational factors, and ranked each factor in relative terms with respect to its influence on the implementation of strategies to reduce door to balloon time. We analyzed these rankings by using Kendall’s W or Kendall’s coefficient of concordance; a non parametric test for overall rank differences among different factors in a group of variables. The results have been shown in table 3.

2.3.1. Results of quantitative analysis

The results in table 3 indicate that the factors under analysis have been ranked significantly different from each other. Kendall’s coefficient of concordance = 0.453, Chi-square = 221.277, and the test result is significant (p-value < 0.01). Positive behaviors and teamwork have been ranked as first and second respectively (summed ranks = 139 and 200, respectively). These two factors have been ranked significantly different from each other. Clinical leadership, feedback, and senior management’s support have been ranked as third, fourth, and fifth, respectively (summed ranks = 214, 232, and 258, respectively). There is not a significantly high difference between ranks from second to fifth, which indicates that the respondents consider these factors equally important with a small difference. However, the results indicate that the relative importance of the factors ranked sixth to ninth is significantly less than the factors ranked first to fifth. The results suggest that the difference between the factors ranked as first five and last four is large enough to ignore the factors ranked as sixth, seventh, eighth, and ninth. In other words, it can
be stated that the respondents believe that positive behaviors, teamwork, clinical leadership, multidisciplinary liaison, and senior management’s support are the most important organizational factors for the implementation of strategies to reduce door to balloon time.

Kendall’s Coefficient of Concordance for rank differences among organizational factors

<table>
<thead>
<tr>
<th>Kendall’s coefficient of concordance (W)</th>
<th>Chi-square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.453</td>
<td>221.277</td>
<td>8</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Rank orders

<table>
<thead>
<tr>
<th>Organizational Factors</th>
<th>Summed Rank order</th>
<th>Percent ranked (1)</th>
<th>Percent ranked in top 3</th>
<th>Percent ranked in top 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive behaviors</td>
<td>139 (1)</td>
<td>48</td>
<td>84</td>
<td>92</td>
</tr>
<tr>
<td>Teamwork</td>
<td>200 (2)</td>
<td>10</td>
<td>66</td>
<td>92</td>
</tr>
<tr>
<td>Committed clinical leadership</td>
<td>214 (3)</td>
<td>15</td>
<td>55</td>
<td>84</td>
</tr>
<tr>
<td>Multidisciplinary liaison</td>
<td>232 (4)</td>
<td>9</td>
<td>38</td>
<td>87</td>
</tr>
<tr>
<td>Senior management’s support</td>
<td>258 (5)</td>
<td>10</td>
<td>27</td>
<td>82</td>
</tr>
<tr>
<td>Monitoring and evaluation</td>
<td>382 (6)</td>
<td>3</td>
<td>10</td>
<td>26</td>
</tr>
<tr>
<td>Flexibility</td>
<td>423 (7)</td>
<td>2</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Resources</td>
<td>424 (8)</td>
<td>2</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Rewards</td>
<td>439 (9)</td>
<td>2</td>
<td>9</td>
<td>16</td>
</tr>
</tbody>
</table>

Table 3: Descriptive statistics and rankings of organizational factors

* Summed rank order is calculated as follows: Σ (Frequency × Rank) for each factor. The total lowest score results in the highest-ranking (1), while the highest total score results in the lowest ranking (9).

3. Discussion

Our qualitative and quantitative analysis identified several organizational factors which can facilitate the implementation strategies to reduce door to balloon time. Now we discuss the importance of the most important five factors.

3.1. Positive behaviors

Among the most important organizational factors, a considerably high rank has been assigned to positive behaviors of professionals involved in STEMI care. Positive behaviors reflect the organizational members’ relationship and the degree of commitment with their organization [24].

Successful implementation of evidence based practices requires the organizational members to fully participate and put extra efforts [25]. Positive behaviors have the ability to affect clinical staff’s willingness to fully engage in the process of implementation or the use of an intervention [26, 27]. These insights from literature suggest that positive behaviors of professionals can be very helpful for achieving a routine use of strategies to reduce door to balloon time.

Achieving door to balloon time requires the participants to adopt a problem solving rather than blaming behavior [28]. Helping behaviors result in problem solving behaviors in organizations [29]. Helping behavior makes a worker prevent work related problem of co-workers. Implementation of evidence based practices requires the participants to exhibit altruism because many problems occur during implementation that require problem solving efforts [30]. If the there exist helping behaviors in organizational members, problem solving efforts are expected to take place for successful implementation of these strategies.
Another form of positive behaviors is conscientiousness which reflects discretionary behaviors of the employees who are available to go beyond minimum task requirements in obeying rules and regulations, punctuality, and hard work [31, 32]. This behavior is especially important for cardiac catheterization team to implement the strategy such as CCL team arrival within 20 minutes. According to clinical implication of an existing research “Patients presenting with AMIs after hours are more likely to be treated with fibrinolytic therapy than PCI” [10]. Some other studies also demonstrated the similar views [33,34,35]. This is perhaps due to poor response from the cath lab team or delays in hospital arrival that the patient cannot benefit from PCI whose benefits are well documented [10]. AMI care literature is evident that many times there comes the need for CCL team during off working hours. CCL team members with conscientiousness are more likely to respond positively to off duty calls.

3.2. Teamwork

Teamwork has been considered as the second most important organizational factor for the implementation of strategies to reduce door to balloon time. Teamwork is defined as the ability of a group of people to work together. Empirical research suggests that strategies to reduce door to balloon time have a substantial effect on door to balloon time. However, the implementation of these strategies does not take place in a vacuum. Healthcare professionals from different specialties participate in a complex, multidisciplinary, and time sensitive process of care which requires a collaborative teamwork between various care-providers [28,36].

Knowledge sharing is an important element of teamwork [37,38]. In STEMI care of patients undergoing PPCI, knowledge sharing is important among the participants involved in reperfusion process. For example; in order to decide for implementing pre hospital triage, knowledge sharing is necessary about acute coronary syndromes, infarct size, ischemic time, patient history etc. After the implementation of pre hospital triage EMS members’ knowledge sharing with coronary unit, emergency department, or CCL staff about the patient conditions mentioned above will make possible the effective implementation of the practices like; single call activation, CCL activation while patient is en route, and the activation of CCL team within 20 minutes. Further, during catheterization the CCL members need to share knowledge about selection of appropriate artery i.e. catheterization via radial artery, or via femoral or brachial artery [39]. Moreover, catheterization process often requires knowledge sharing on the complications such as bleeding, pseudoaneurysms, arteriovenous fistula, nerve damage, and arterial occlusion etc. So, teamwork is expected to enhance the quality of care through successful implementation of strategies to reduce door to balloon time.

Another important element of teamwork is goal sharing. Goal sharing refers to the members’ priority to team’s common task over other obligations [37,40,41]. Effective implementation of evidence based healthcare practices is dependent on the sharing of common goal among all involved [42]. From an organizational culture perspective, organizations with a culture of sharing common values and goals are more likely to succeed in their implementation efforts [43].

Mutual respect is another important component of teamwork. Mutual respect is especially important for teams with highly specialized skills, and different occupational identities and status [44]. Mutual respect in this case is important because the differences in status and occupational identities serve as a source of pride, as well as a source of invidious comparison [44]. People working on reperfusion process for achieving door to balloon times have different status and occupational identities. For example, an interventional cardiologist has a very different status and occupational identity from an EMS technician or CCL assistant. However, every one’s work is important for implementing these strategies. For example, in order to achieve a rapid door to balloon time, the contribution of an EMS nurse for obtaining ECG during the implementation of pre hospital triage is as important as an interventional cardiologists’ contribution during catheterization. The existence of distinct occupational identities creates a potential for divisive relationships, and can hamper the coordination process if disrespect takes place over mutual respect.
Communication is also an important element of teamwork. In order to implement strategies to reduce door to balloon time, professionals’ teams require timely and frequent communication for single call activation, prehospital activation, having the CCL ready in 20 min, and real-time data feedback.

3.3. Clinical leadership

Clinical leadership has been ranked as third most important factor, and is slightly lower than teamwork. Unlike industrial organizations, the concept of leadership in healthcare organizations is not limited to the leadership from governing body, and the chief executive officer and other senior managers [45]. Due to the presence of an organized body of clinical professionals, healthcare organizations have a diffuse leadership structure [46]. This diffuse structure manifests that the leadership in healthcare organizations may come from different sources [46,47]. In most healthcare organizations we can find a group of leaders recognized as clinical or physician leaders [45]. The presence of this group is because the physicians possess a unique body of knowledge that confers a certain measure of autonomy in clinical decision making [46]. Thus, the clinical leaders play a critical role in the process of implementation and resource allocation.

Clinical leaders are well positioned to take initiatives for implementation and remove barriers among individuals and departments [47]. Among the common principles necessary for successful implementation of TQM/CQI in hospitals, commitment from physician leadership has been considered as a distinct principle along with the top management commitment [47]. Senior management and physician leaders, although work together toward a common goal, both groups of leaders use different professional philosophies during a work process. The common professional philosophy used by senior management can be explained as the support for quality improvement and the availability of human and technical resources [48], while the professional philosophy of clinical leaders follows the concepts of presence, engagement, facilitation, and leading the change implementation [48].

An important distinction between senior management and the physician leaders is that clinical leaders have the standing to provide clinical supervision and oversight of its members’ clinical care and performance [45]. While performing supervisory role, they are well positioned to lead change. This supervisory role involves them in direct interactions with the clinical staff during the implementation process. Implementation of evidence based practice takes place majorly through the medical staff who works under the supervision of clinical leaders. So, clinical leaders are an important organizational factor for the implementation of strategies to reduce door to balloon time.

3.4. Multidisciplinary liaison

Among the most important organizational factors, multidisciplinary liaison has been ranked number four. According to Longman dictionary of contemporary English liaison is defined as “the regular exchange of information between groups of people, especially at work, so that each group knows what the other is doing”. In STEMI care with PCI many organizations and departments, such as emergency medical services, primary care units, emergency department, coronary unit, catheterizations unit etc. are involved. So, a multidisciplinary liaison is necessary for implementing strategies to reduce door to balloon time.

In the process of STEMI care with PCI there are a number of factors that are beyond the control of interventional cardiology. For example, activation of cath lab depends much on cooperative behavior of emergency medical services. Depending on time from symptoms onset to first medical contact (FMC), EMS has a greater responsibility in identifying STEMI, selecting reperfusion strategy, notifying for CCL activation, and speedy transfer to receiving hospital. On the hospital end, a rapid response to EMS notification by activating cath lab and preparing cath lab team puts high responsibility on all involved from the person who receives the notification to cath lab staff. If the patient comes to emergency department (ED) by personal means, it is the responsibility of ED team to recognize STEMI as soon as possible, notify for the activation of cath lab and cath lab team, and rapidly transfer the patient to CCL.
These activities require regular exchange of information, timely and accurate communication [49] with cardiology unit and interventional cardiology, rapid patient transfer, and trusting behaviors among all involved in reperfusion process. All this is possible through a good multidisciplinary liaison.

3.5. Senior management’s support

Senior management’s support has been ranked as fifth most important organizational factor. Senior management’s support refers to the extent to which top management takes interest in implementing these strategies, and is willing to provide necessary resources and remove barriers. Incentives and support in staffing issues are especially important when the hospitals seek to implement the strategies such as ‘an attending cardiologist is always on site’ and ‘staff arrival in cath lab within 20 minutes of being paged’. Moreover, managing recourses and establishing suitable mechanisms for real time data feedback also depend on senior management’s support. Without a support from senior management, hospitals may face the shortage of equipment and other resources, and consequently the implementation of these strategies may become very difficult.

In sum, the results indicate that successful implementation of strategies to reduce door to balloon time will encompass positive behaviors of professionals involved in STEMI care, teamwork, committed clinical leaders, multidisciplinary liaison, and senior management’s support. These factors are imperative for the implementation of these strategies. To a great extent, the factors identified in this research are consistent with earlier conceptualization of the approaches for reducing door to balloon time [28]. However, an organizational focus specific to the strategies to reduce door balloon time was lacking in literature. We believe that an appropriate level of organizational factors identified in this research will promote amenable use of these strategies.

4. Conclusion

Recognizing the fact that most STEMI patients exceed their door-to-balloon times, hospitals are struggling to reduce treatment delays. Evidence from existing research suggests that the strategies to reduce door to balloon time have greater ability to reduce treatment time. However, these strategies are underutilized, and the reason behind this underutilization may be found in the absence of specific organizational factors. Taking into account the underutilization of these strategies, we conducted this research with the purpose of exploring organizational factors that can facilitate the routine use of these strategies. The results of this research suggest that evidence based strategies, although important, may not be sufficient for reducing door to balloon time. This research contributes to improve understanding of professionals and researchers about the organizational factors that are important for the implementation of these strategies.

As with any research, this study also has some limitations. This research explored a group of organizational factors, but a causal relationship between these factors and the implementation of the strategies to reduce door to balloon time remains to be determined. Future research can use these factors for examining such relationship. This research was not aimed at testing theory, but to explore organizational factors specific to the implementation of strategies to reduce door to balloon time. Future research can use theoretical underpinnings to develop hypothetical relationship between these specific organizational factors and the implementation of the strategies to reduce door to balloon time. Future research can also investigate into how these factors can be established in STEMI care organizations.
Acknowledgement

The authors are thankful to Dr. Carlos Macaya, ex-president of Spanish Cardiology Society, and Dr. Javier Goicolea, the head of interventional cardiology of Hospital Puerta de Hierro for their continuous support during this research. The authors are also thankful to all the participants of this research.

References


